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MINERAL RESOURCES OF THE PROVINCE OF QUEBEC, CANADA.

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A PAPER READ BEFORE
THE INSTITUTION OF MINING ENGINEERS.

BY

J. OBALSKI, H.M. INSPECTOR OF MINES.

TWELFTH ANNUAL GENERAL MEETING AT GLASGOW,
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MINERAL RESOURCES OF THE PROVINCE OF QUEBEC, CANADA.

By J. OBALSKI, H.M. Inspector of Mines.

The province of Quebec covers an area of 347,000 square miles, being twice as large as the British Islands, and extends for about 1,400 miles from east to west and 600 miles from north to south, with a population of less than 2,000,000. It is practically crossed from east to west by the water-courses formed by the St. Lawrence and Ottawa rivers, dividing the country into two well-defined districts, which are drained by numerous and important rivers. The tributaries are only navigable for small lengths of their courses, but they are of great use for the drifting down of timber and afford important waterfalls, which are beginning to be used for motive power.

The country north of the St. Lawrence and Ottawa rivers is formed of metamorphic and eruptive rocks known under the general name of Laurentian. The southern shore comprises several series from the Cambrian to the Devonian, with a few eruptive mountains, forming a continuation of the Allegany chain. The immediate valley of the St. Lawrence and Ottawa rivers is formed by Lower Silurian limestone and shales, while towards the south, the older Cambrian and pre-Cambrian rocks have been brought to the surface by a great fault running north-eastward. Devonian rock appears only at the surface in Gaspesia, forming the eastern part of the province, and Anticosti island.

Only a relatively small part of that large territory has been prospected, but, nevertheless, from the geological study which has been made, we know what kind of minerals may be expected, although new discoveries may happen.

In the Laurentian formation, the following minerals occur: Phosphates of lime (apatite), mica (white and amber), plumbago, magnetite, titanic iron, felspar, etc. In the other series, occupying

the south, are found copper-ores, magnetite, hæmatite, alluvial gold, asbestos, chromite, soapstone, etc.

In the central district there are important indications of combustible gas and oil, and in the extreme east, oil has been found. On both shores of the St. Lawrence, the rock is generally covered by alluvial drifts; peat, bog iron-ore, clay and marl are found in abundance, while where the rock outcrops, there is a large supply of material which is used for building and ornamental purposes and for lime-making.

Amongst this great variety of minerals must be deplored the absence of coal, which has to be obtained from Nova Scotia and Pennsylvania; but in many mining districts, wood, so plentiful in this province, is used as fuel, and several trials are being made just now for the preparation and industrial use of peat.

Iron.—Although the iron-industry of this province is the oldest established in North America, there are only two small furnaces using bog-ore, and they produce the highest quality of charcoal pig-iron, 6,700 tons having been made last year. Several attempts were made 30 or 40 years ago to smelt the magnetic ore found in the vicinity of Ottawa, the magnetic sand of Moisic, and the titanic ore of St. Urbain, but without financial success. Several mines of magnetite and hæmatite are scattered through the province, but the most important are the magnetic sand-deposits of Moisic, St. John and Natashquan, on the northern shore of the Gulf. It is estimated that many million tons of ore, containing 70 per cent. of iron, practically free from phosphorus or sulphur, could be obtained by a proper concentration getting rid of the titanium, which is found as titanic iron with the sand: several machines have been introduced for this purpose.

Copper.—In the vicinity of Sherbrooke, large bodies of copper-ore, yielding an average of 4 per cent. of copper, 35 per cent. of sulphur, and a little silver, are regularly worked with an average output of 30,000 to 40,000 tons a year. Part is used on the spot for the manufacture of sulphuric acid, the remainder and the burnt ore and mattes being shipped to the United States. Several other deposits, some of them of high-grade ores, were extensively worked about 25 years ago, and abandoned later for several reasons, but they may be again reopened.

Gold.—In the Beauce district, alluvial gold has been worked in an intermittent manner, the total production has been estimated at £400,000 (2,000,000 dollars). Actually those alluvials are only worked on a small scale.

Asbestos.—The asbestos-industry is one of the most important, having produced last year £150,000 (750,000 dollars) of raw material. The mines of asbestos are located in a serpentine belt, which is extensively worked at Thetford, Black Lake and Danville. Asbestos is shipped to the United States and Europe.

Chromite.—Chromite is found near Black Lake. The ore is variable in quality, but when it contains less than 50 per cent. of sesqui-oxide of chromium, it is concentrated to reach that grade. About 2,500 tons are obtained yearly, and sent mostly to the United States.

Mica.—In the Ottawa county, amber mica is found and worked at many places, the value at the mines of the output being about £30,000 (150,000 dollars) a year. It is shipped uncut, on account of the high duty on cut mica, to the United States, where it is used in the manufacture of electric machinery. White mica also exists in several places, but it is not at present worked.

Among the minerals of minor importance is the apatite of the Ottawa region, where it is very abundant and was worked with success, at one time, producing an average of 25,000 tons a year; but since the discovery of phosphate of lime in Florida and South Carolina, the mines have become unprofitable.

A deposit of galena is being worked at Lake Temiscaming, and some other deposits of more or less importance are known, but are not at present being developed.

In the eastern townships, there is an antimony-mine, not now worked, and also numerous deposits of soapstone.

In the Laurentian formation, graphite, mostly in a disseminated form, has been worked, with but little success; a few concentrating mills have been erected, and some mineral is also shipped in the crude form to the United States.

Felspar is abundant, but finds a limited market. Sulphate of baryta is worked to a small extent. Molybdenite is found in

a few places, but it is not developed. In Magdalen islands, manganese has been discovered.

Some borings have been made for gas in the Trenton formation, showing good indications. In Gaspé, prospecting for oil has been carried on for several years, and many wells have been bored to a great depth. Oil of a first-class quality has been found, but so far not yet in commercial quantity.

Granite, marble and limestone of a good quality are found in all the formations of the province, and used for the local building-industry. Lime and bricks are manufactured at numerous places. Large areas of peat are found in many districts, but are not yet used. Ochre of good quality is manufactured near Three Rivers, and many other deposits are known.

The mines on all the lands, not sold previously to 1880, still belong to the Government, which disposes of them by sales or leases at reasonable prices.

The total value of the crude products at the mines represents about £500,000 (2,500,000 dollars) yearly, 5,500 men being employed in this industry. Transport in the open districts is easy. Wood fuel is abundant, and Nova Scotian coal is worth 16s. 8d. (4 dollars) a ton. Labour is cheaper than usual in America, 4s. (1 dollar) being the average wage of unskilled men. Water-power has not been much used so far for mining purposes, but it may be used with proper transmission of power.

In conclusion, although the province of Quebec is not of the first rank as a mining country, the few industries so far developed are generally prosperous, and afford good returns upon the invested capital.

The PRESIDENT (Mr. J. S. Dixon) moved a vote of thanks to Mr. Obalski for his interesting paper.

Mr. M. WALTON BROWN seconded the resolution, which was cordially approved.